
The Genus *Podocerus* (Crustacea: Amphipoda: Podoceridae) from Guana Island, British Virgin Islands

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Abstract

A new species of *Podocerus* is described from Guana Island, British Virgin Islands. *Podocerus jareckii* n. sp. has dorsal carinations and an interramal spine on uropod 1. A second species of *Podocerus* collected from similar habitats lacks dorsal carinations and uropodal interramal spines; it is indistinguishable from *Podocerus fissipes* described from the coast of Brazil. The relationships of the species reported here to *Podocerus* found in Bermuda, and in the Caribbean and Mediterranean Seas, are discussed.

Keywords

Caribbean Sea, new species, *Podocerus fissipes*, new record, zoogeography.

Introduction

In general, the amphipod species of the Caribbean region are known from sporadic records and from descriptions of single species associated with specific areas or islands (Baldinger 2000). Other than an identification manual for the common marine amphipods of southern Florida (Thomas 1993), and a pictorial key to the families and genera of the tropical western Atlantic Ocean (Ortiz 1994), no monographs on the amphipods from the Caribbean have been published. Thomas (1993) recognized three podocerid amphipods from southern Florida: *Podocerus kleidus* Thomas and Barnard 1992, *Podocerus brasiliensis* (Dana 1853), and *Podocerus chelonophilus* (Chevreux and de Guerne 1888). In contrast, the amphipod fauna of the mid-Atlantic island of Bermuda has been relatively well studied (Kunkel 1910; Lazo-Wasem and Gable 1987, 1989; Gable and others 1988; Lazo-Wasem and others 1989; Gable and Lazo-Wasem 1990; Baldinger and Gable 1994, 1995; Ruffo and others 2000). *Podocerus*

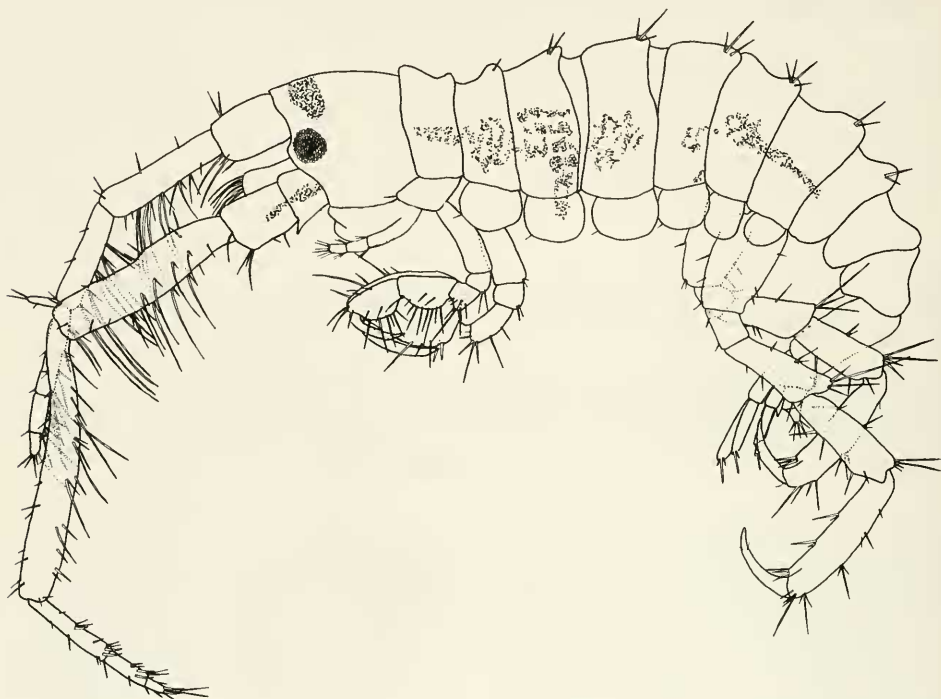


Figure 1

Podocerus jareckii. YPM 24061, female, 2.8 mm.

tachyrheo Baldinger and Gable 1994 and *Podocerus lazowasemi* Baldinger and Gable 1994 are considered endemic to Bermuda.

Examination of specimens found living in sponges or in association with coral rubble from Guana Island, British Virgin Islands, has added one new species, *Podocerus jareckii*, to the Caribbean amphipod fauna. A second species was found in habitats similar to those of *P. jareckii*. This second species is indistinguishable from *Podocerus fissipes* Serejo 1995, originally described from the coast of Brazil. Its occurrence in Guana represents a new

distributional record for the Caribbean. Reanalysis of type material has revealed that some of Serejo's (1995) characters were inaccurately or incompletely described, and we discuss these discrepancies below.

Materials and Methods

Guana Island (lat 18°28'24"N, long 64°34'30"W) lies just north of Tortola in the British Virgin Islands, and is a small island of approximately 3 km², with a maximum elevation of 246 m. Amphi-

pods from Guana Island were collected by E. A. Lazo-Wasem and A. J. Baldinger over a six-year period (1995 to 2001) from as many different microhabitats as possible. Specimens were either hand-picked from algal scrapings or screened from formalin washes of specific substrates in the field, and preserved in 70% EtOH. Samples were then sorted to the lowest taxonomic rank possible, and detailed investigations of selected specimens were made under a dissecting microscope. Mouthparts and appendages were dissected and mounted in glycerin on microscope slides. Morphological characters were described and illustrations were made with the aid of a camera lucida.

Type and voucher specimens are deposited at the Peabody Museum of Natural History, Yale University (YPM), and at the Museum of Comparative Zoology, Harvard University (MCZ). We also examined the types of *P. fissipes* deposited in the Museu Nacional UF Rio de Janeiro (MNRJ).

In the figures, body parts are marked by the following abbreviations:

A	antenna
Gn	gnathopod
UL	upper lip
LL	lower lip
Md	mandible
Mx	maxilla
Mxpd	maxilliped
P	pereopod
Pl	pleopod
T	telson
U	uropod
R	right
L	left

Gnathopods are numbered Gn1 and Gn2; pereopods are numbered P3 through P7.

Systematic Descriptions

PODOCERUS JARECKII, NEW SPECIES

Figures 1 through 5.

Material examined. YPM 24069, male holotype, 2.1 mm, British Virgin Islands, Guana Island, Monkey Point, west side; formalin wash of purple-brown sponge; depth 2 m; collector E. A. Lazo-Wasem and A. J. Baldinger, 14 October 1999 [GUA 99-08]. YPM 24061, female paratype, 2.8 mm, same data as holotype. YPM 24062, male paratype, 2.2 mm, same data as holotype. YPM 24063, male paratype, 2.7 mm, same data as holotype. YPM 24064, 3 paratypes, same data as holotype. YPM 24066, male? paratype, 1.7 mm, same data as holotype. YPM 24067, male? paratype, 2.1 mm, same data as holotype. YPM 24068, female paratype, 1.9 mm, same data as holotype. YPM 24065, male paratype, 2.4 mm, British Virgin Islands, Guana Island, Crab Cove; formalin wash of large pieces of coral rubble; depth 3 m; collector E. A. Lazo-Wasem and A. J. Baldinger, 13 October 1999 [GUA 99-01]. MCZ 37444, 5 paratypes, British Virgin Islands, Guana Island, Monkey Point, west side; formalin wash of purple-brown sponge; depth 2 m; collector E. A. Lazo-Wasem and A. J. Baldinger, 14 October 1999 [GUA 99-08]. YPM 24251, 2 males, 1 female (ovigerous), 1 juvenile, British Virgin Islands, Guana Island, Bigelow Beach; on green algae attached to *Diploria* sp.; depth 1 m; collector A. J. Baldinger, 23 October 2000 [GUA 00-06]. YPM 24252, 2 males, 3 females (2 ovigerous), British Virgin Islands, Guana Island, Bigelow Beach; on flattened, light green sea rod; depth 1 m;

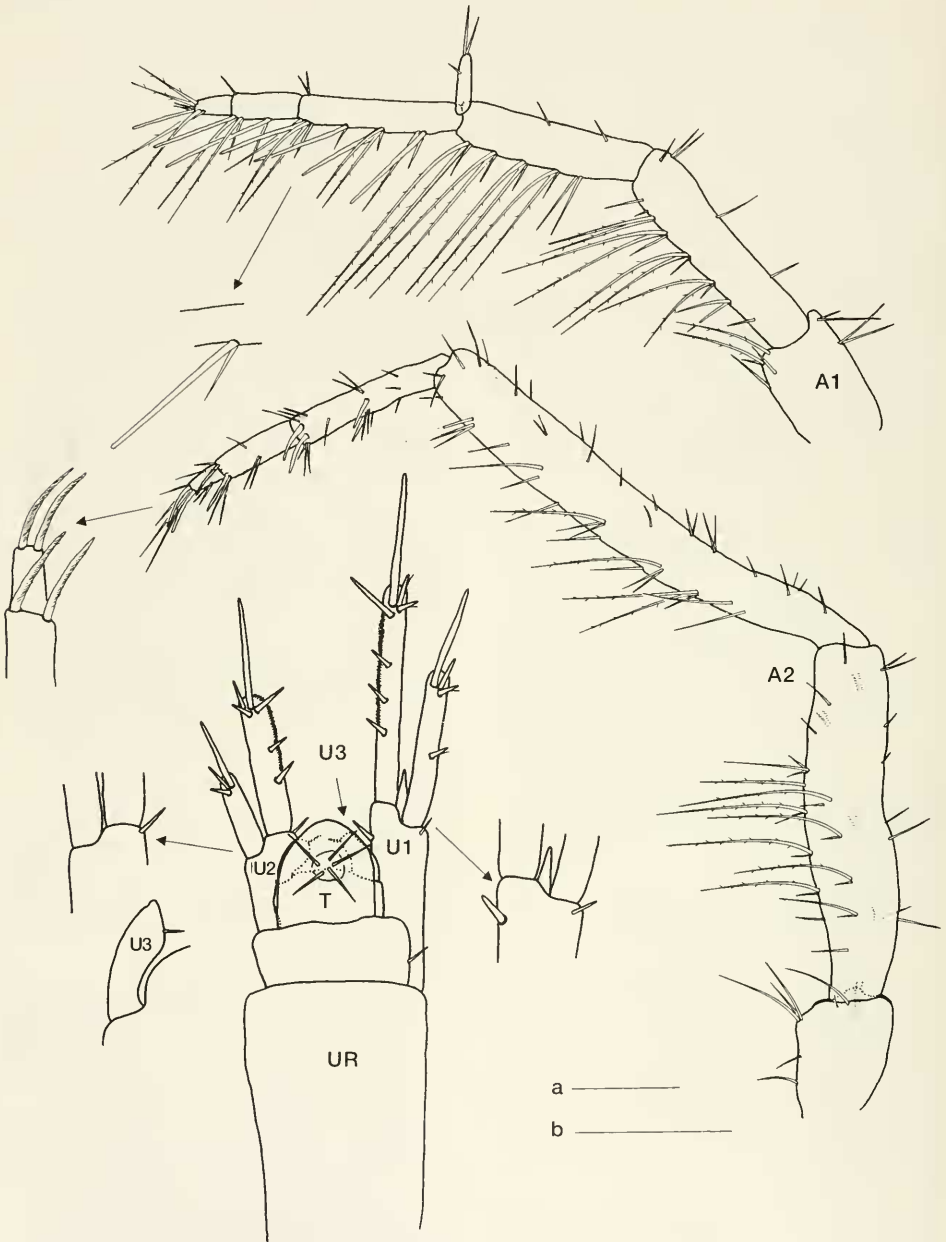


Figure 2

Podocerus jareckii. YPM 24062, male, 2.2 mm. Scale: a (A1, A2), 0.1 mm; b (UR), 0.1 mm.

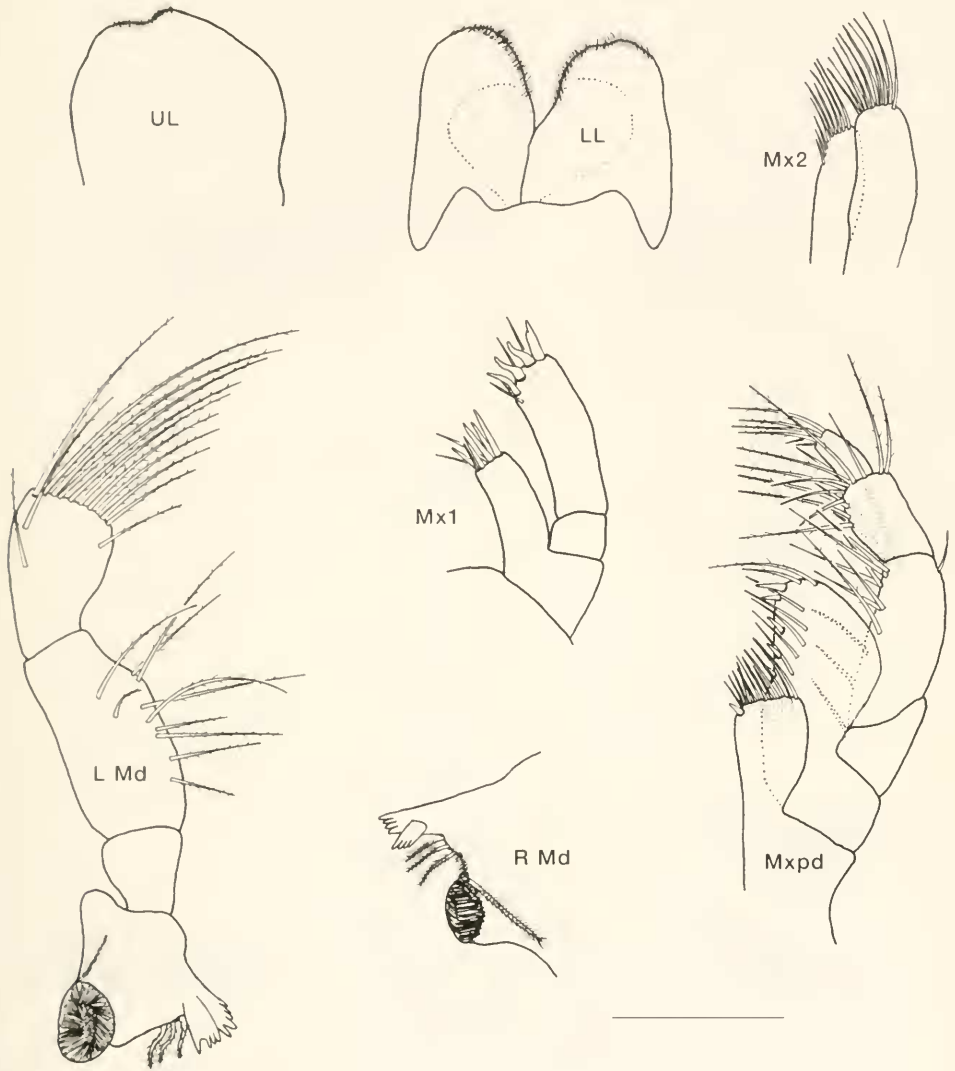


Figure 3

Podocerus jareckii. YPM 24062, male, 2.2 mm. Scale 0.05 mm.

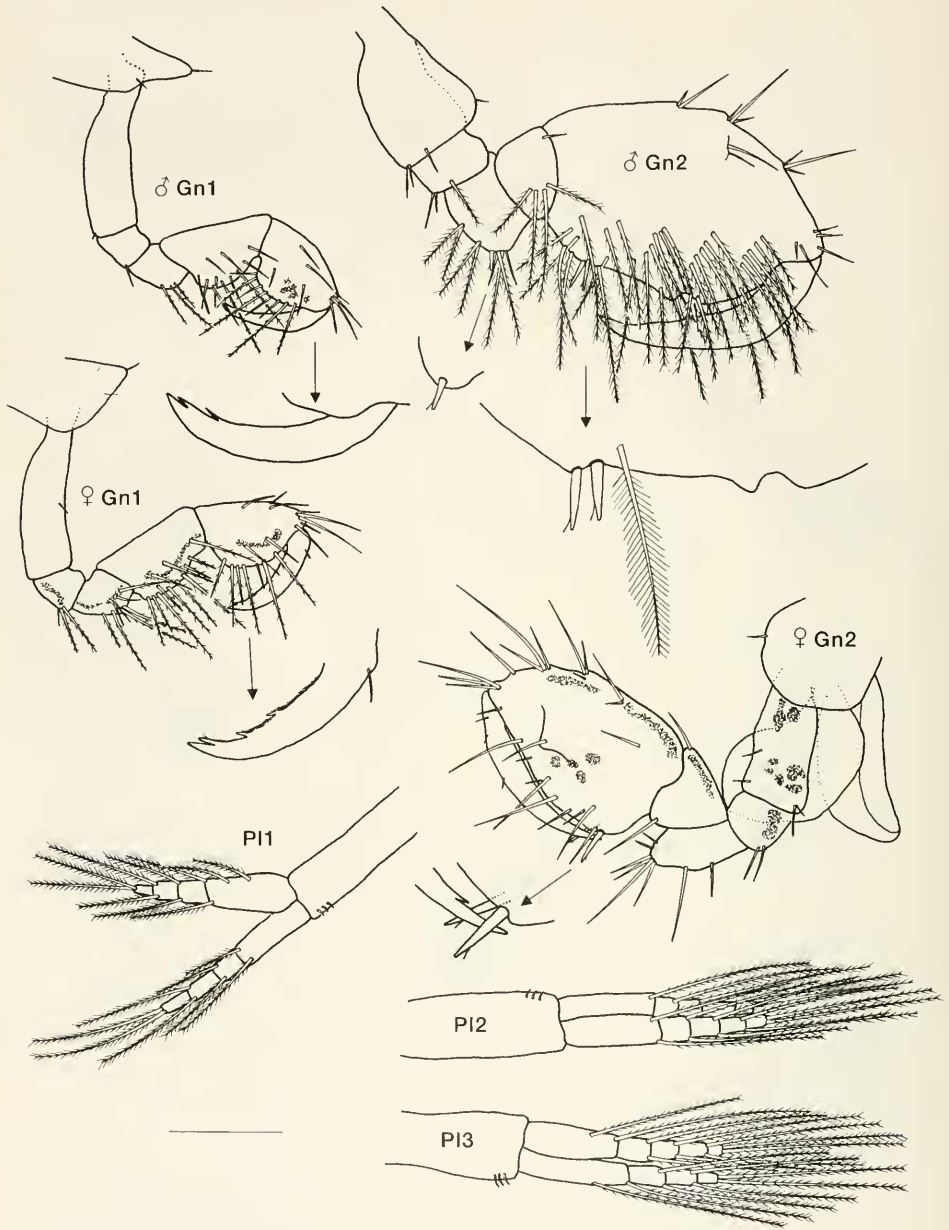


Figure 4

Podocerus jareckii. YPM 24062, male, 2.2 mm, PI 1-3. YPM 24061, female, 2.8 mm. Scale 0.1 mm.

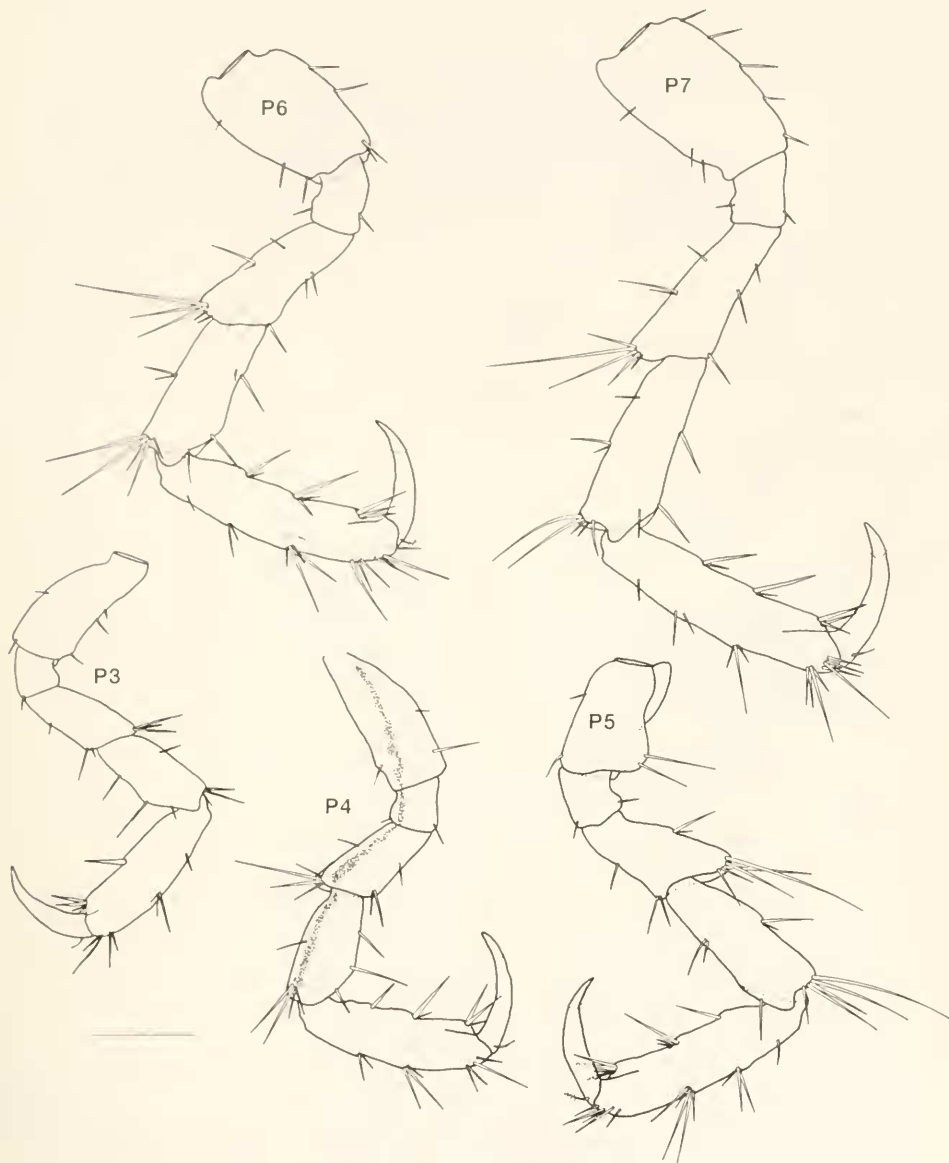


Figure 5

Podocerus jareckii. YPM 24062, male, 2.2 mm, P4–P7. YPM 24069, male, 2.1 mm, P3. Scale 0.1 mm.

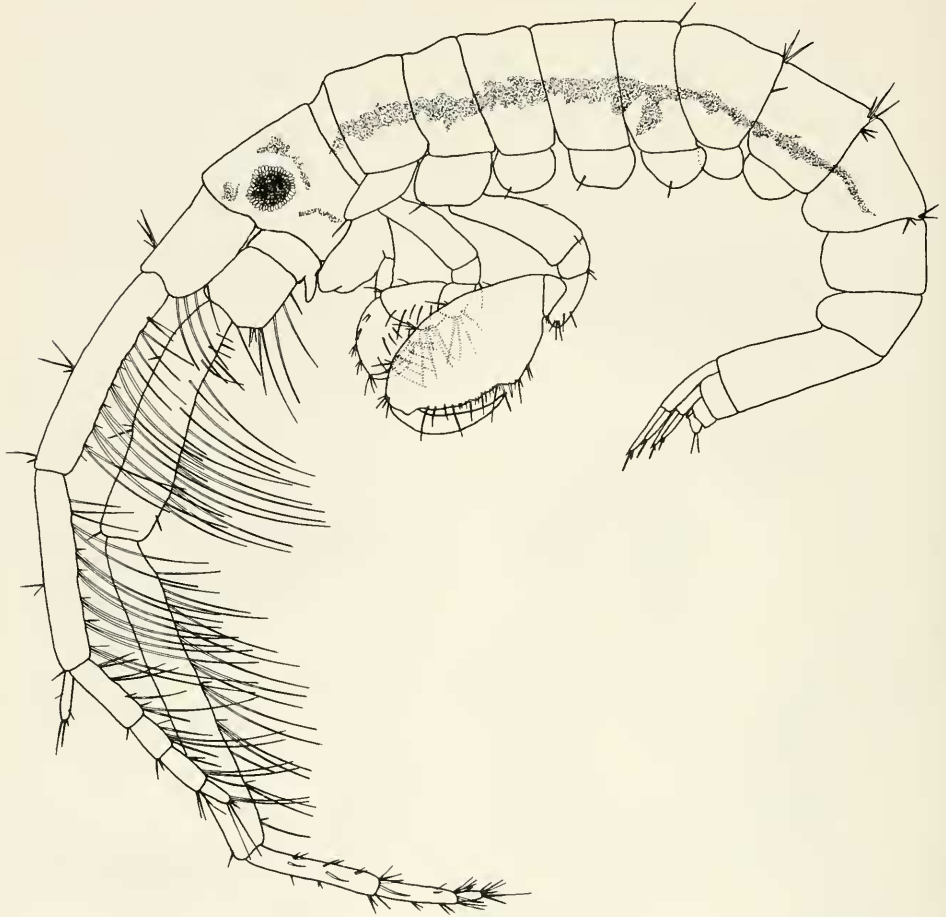


Figure 6

Podocerus fissipes, from Guana Island. YPM 24074, male, 3.0 mm.

collector A. J. Baldinger, 23 October 2000 [GUA 00-07]. YPM 24253, 1 male, British Virgin Islands, Guana Island, Bigelow Beach; on yellow-orange sponge; depth 1 m; collector A. J. Baldinger, 23 October 2000 [GUA 00-08].

Diagnosis. Body with dorsal carinations. Pereonites 2 through 7 and pleonite 1 with dorsal spines. Antenna 2 flagellum 3-

articulate, each article with distinct spines. Uropod 1, peduncle with distal interramal spine. Dorsal lobe of telson with 5 long spines.

Description. *Male:* 2.2 mm in length. Body with dorsal carinations (Figure 1). Pereonites 2 through 7 and pleonite 1 with dorsal spine groups. Head cuboidal, slightly longer than pereonites 1 and 2.

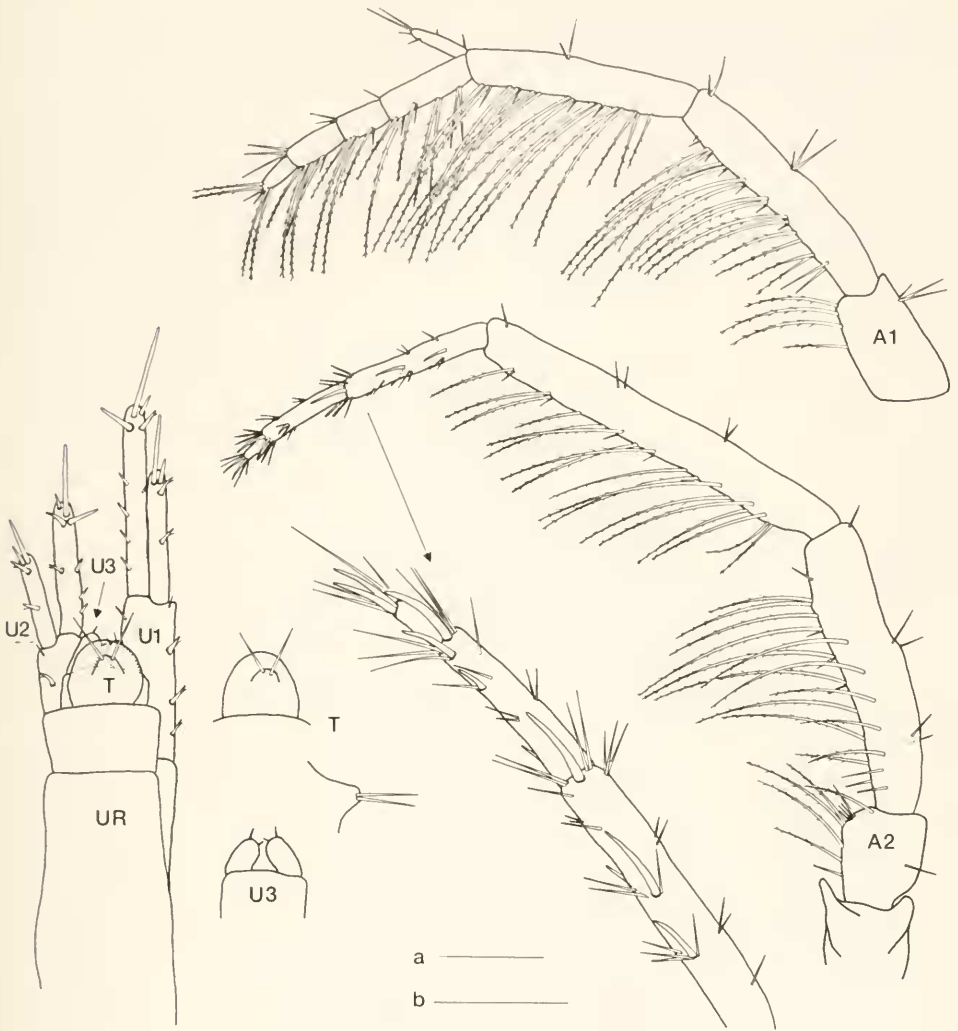


Figure 7

Podocerus fissipes, from Guana Island. YPM 24075, male, 3.0 mm. Scale: a (UR), 0.1 mm; b (A1, A2), 0.25 mm.

Eyes pigmented. Coxae reduced, with serial discontinuity.

Antenna 1 (Figure 2), 60% of total body length, peduncular ratio 1:2:1.7; peduncle article 3 with plumose setae equal to or longer than article length; flagellum 3-articulate, each article bearing setae and

aesthetascs; accessory flagellum 1-articulate. Antenna 2 (Figure 2) greater than antenna 1 in length, article 4 of peduncle 66% the length of article 5; flagellum 3-articulate, each article with distinct spines.

Upper lip (Figure 3) rounded, anterior

Table 1

Morphological variation in males of four species of *Podocerus*.

	<i>P. jareckii</i> 2.2 mm	<i>P. kleidus</i> 4.5 mm	<i>P. lazowasemi</i> 3.3 mm	<i>P. schieckei</i> 2.5 mm
Type locality	Guana, BVI	Florida Keys, USA	Bermuda	Mediterranean Sea
Interramal spines on uropod 1	Present	Present	Present	Absent
Interramal spines on uropod 2	Absent	Present	Present	Absent
Number of spines on telson	5	9	4	2
Number of flagellar articles on antenna 1	3	6	5	?
Spines on flagellum of antenna 2	Present	Absent	Present	?
Morphology of coxal plate of gnathopod 1	Rectangular	Cleft	Rhomboidal	Rectangular
Number of spines on article 4 of gnathopod 2	1	3	0	1
Number of spines between palm and posterior margin of gnathopod 2	2	1	4	1-2

margin slightly concave with fine setae. Left mandible (Figure 3), molar triturative, with an accessory plumose seta, inner margin with 3 plumose setae, incisor with 5 teeth, lacinia mobilis with 4 teeth; palp 3-articulate, terminal article clavate, with facial and apical plumose setae. Right mandible similar to left, but incisor and lacinia mobilis both with 4 teeth. Lower lip (Figure 3) normal, anterior margins with fine setae. Maxilla 1 (Figure 3), inner

plate absent; outer plate with 5 apical spines; palp 2-articulate, terminal article with 4 apical spines and submarginal setae. Maxilla 2 (Figure 3), plates subequal in width, both with apical setae. Maxilliped (Figure 3), inner plate with marginal and submarginal setae and a single inner marginal spine; outer plate with inner marginal spine row and submarginal setae; palp 4-articulate, articles 2 and 3 with marginal plumose setae, terminal

article shorter than article 3, with apical plumose setae.

Gnathopod 1 (Figure 4), coxal plate rectangular, with a distoanterior seta; basis elongated; articles 5 and 6 subequal in length, posterior margin of article 5 expanded, with marginal and submarginal setae, some plumose; palm of article 6 with marginal setae, some plumose; dactyl extending to middle of article 5, bifurcate, with one subterminal marginal spine.

Gnathopod 2 (Figure 4), robust and much larger than gnathopod 1; article 4, disto-posterior margin with plumose setae and a single spine; articles 5 and 6 densely covered with plumose setae, palm of article 6 with irregular margin bearing a conical tooth, hind margin demarcated distally by two bifurcate spines. Pereopod 5 (Figure 5), basis forming distal posterior lobe with 2 marginal setae, and a proximal posterior plate-like extension; pereopods 6 and 7 (Figure 5), bases each with a proximal posterior plate-like extension; pereopods 3 and 4 (Figure 5) anterior margins of article 6, and pereopods 5 through 7 posterior margins of article 6 with stout setae.

Pleopods 1 through 3 (Figure 4) long and slender, peduncles with 3 coupling hooks; rami with plumose setae. Uropod 1 (Figure 2), peduncle with short interramal spine; peduncle and rami with marginal and apical spines; inner margin of inner ramus minutely serrate. Uropod 2 (Figure 2), peduncle lacking interramal spine; peduncle and rami with marginal spines, rami with distinct apical spines; inner margin of inner ramus minutely serrate. Uropod 3 (Figure 2) vestigial, with single marginal setule. Telson (Figure 2) dorsally produced and armed with 5 long setae arranged in a circular pattern.

Female: 2.8 mm in length. All features same as male except as follows: gnathopod 1 (Figure 4), dactyl inner margin serrate, medially and subterminally bifurcate and not reaching middle of article 5; gnathopod 2 (Figure 4), article 4 lacking spine on distal margin; articles 5 and 6 not densely covered with plumose setae; palm straight.

Etymology. This species is named in honor of Henry Jarecki, owner and proprietor of Guana Island.

Remarks. *Podocerus jareckii* is similar to *P. kleidus* from the Florida Keys, the Bermuda endemic *P. lazowasemi* and the Mediterranean Sea endemic *Podocerus schieckei* Ruffo 1987 (see Table 1). Both *P. kleidus* and *P. lazowasemi* have an interramal spine on the peduncle of uropods 1 and 2. *Podocerus jareckii* has an interramal spine only on the peduncle of uropod 1, and *P. schieckei* lacks uropodal peduncular interramal spines. *Podocerus jareckii* can also be distinguished from *P. schieckei* by the spination of the urosome: *P. schieckei* has longer apical spines on the rami of uropods 1 and 2, and has 2 spines instead of 5 on the telson. Other differences are listed in Table 1.

PODOCERUS FISSIPES SEREJO 1995
Figures 6 to 12.

Serejo 1995: 49–57, figs. 1–3.

Material examined. YPM 24074, male, 3.0 mm, British Virgin Islands, Guana Island, probably Monkey Point; depth 0.1 m; collector E. A. Lazo-Wasem and A. J. Baldinger, 14–15 October 1999 [GUA

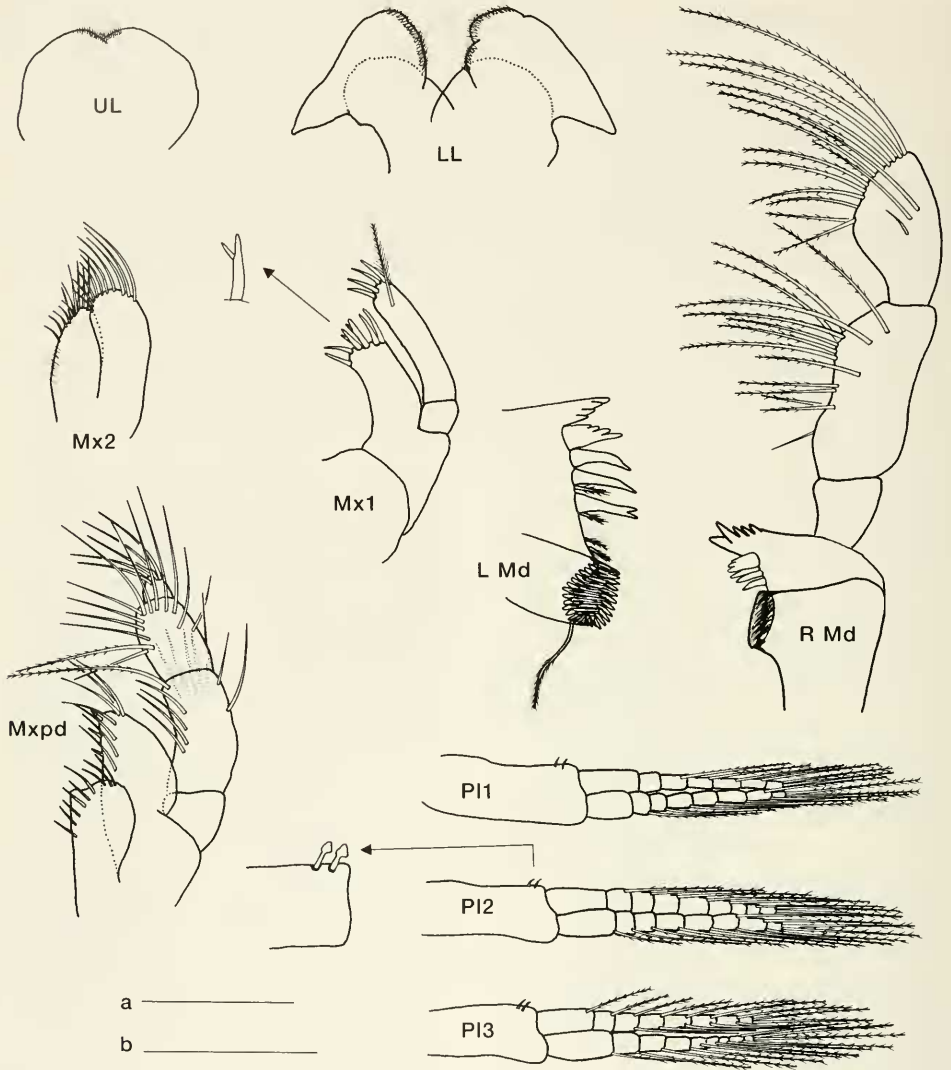


Figure 8

Podocerus fissipes, from Guana Island. YPM 24075, male, 3.0 mm. Scale: a (PI 1-3), 0.25 mm; b (mouthparts), 0.1 mm.

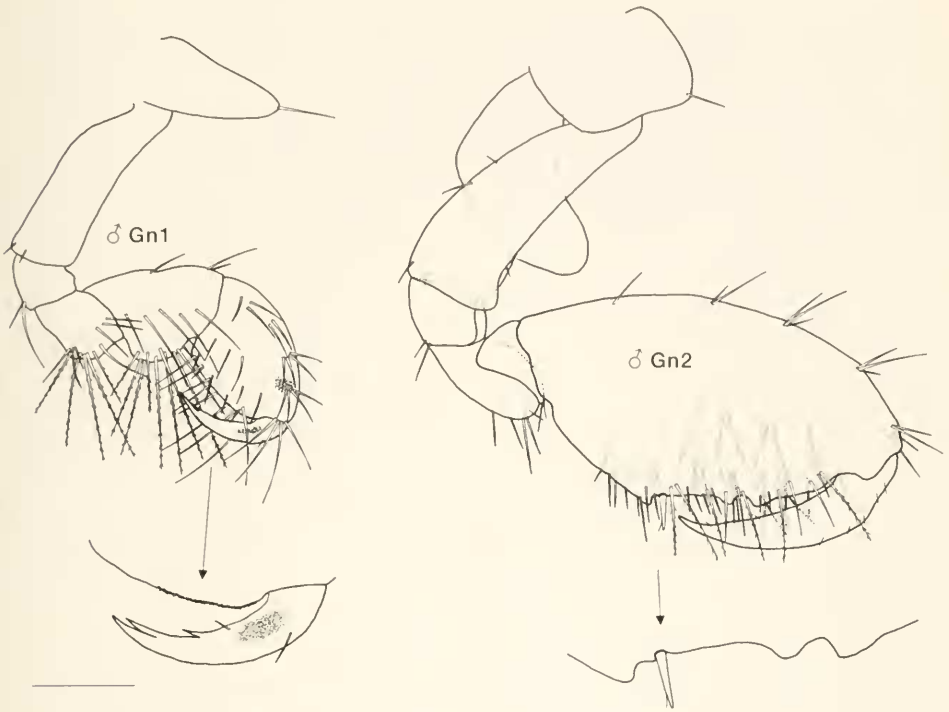


Figure 9

Podocerus fissipes, from Guana Island. YPM 24075, male, 3.0 mm. Scale 0.1 mm.

99-32]. All remaining specimens examined have the same collection data as YPM 24074, except as noted: YPM 24075, male, 3.0 mm; YPM 24073, female, 3.2 mm; YPM 24070, 60 specimens; YPM 24071, ovigerous female, 3.2 mm; YPM 24076, 3 males, 2.4 to 3.4 mm; YPM 24254, male, 2.8 mm; YPM 24255, male, 3.0 mm. MCZ 37445, 10 specimens, British Virgin Islands, Guana Island, probably Monkey Point; depth 0.1 m; collector E. A. Lazo-Wasem and A. J. Baldinger, 14–15 October 1999 [GUA 99-32]. MNRJ 6423, male holotype, 2.3 mm, Brazil, Rio de Janeiro, at Prainha in Arraial do Cabo; collector C. S. Serejo and L. Santi, 24 March 1994.

MNRJ 6431, male paratype, 2.8 mm, same data as MNRJ 6423.

Diagnosis. Body smooth, without dorsal carinations. Pereonites 5 through 7 and pleonite 1 with dorsal spine groups. Antenna 2, flagellum 3-articulate, each article with distinct spines. Uropods 1 through 3 lacking interramal spines. Dorsal lobe of telson with 2 long spines.

Description. *Male:* 3.0 mm in length. Body smooth, without dorsal carinations (Figure 6). Pereonites 5 through 7 and pleonite 1 with dorsal spine groups. Head cuboidal, slightly shorter than length of

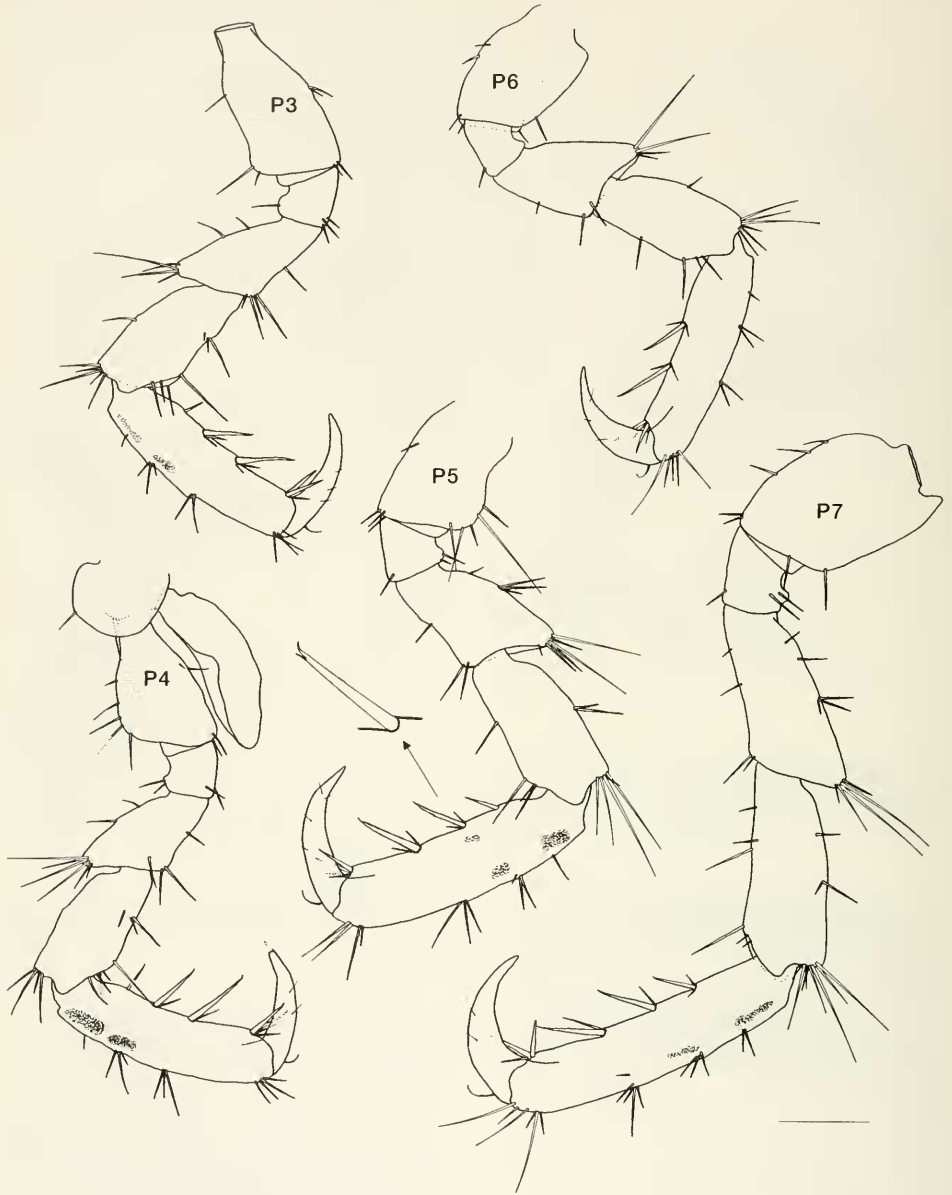


Figure 10

Podocerus fissipes, from Guana Island. YPM 24254, male, 2.8 mm, P3-P5, P7. YPM 24255, male, 3.0 mm, P6. Scale 0.1 mm.

pereonites 1 and 2 combined. Eyes pigmented. Coxae reduced with serial discontinuity.

Antenna 1 (Figure 7), 70% of total body length, peduncular ratio 1:2:1.7, peduncular articles 2 and 3 with plumose setae equal to or longer than length of each article, respectively; flagellum 4-articulate, with marginal plumose setae; accessory flagellum 1-articulate. Antenna 2 (Figure 7) longer than antenna 1, article 4 of peduncle 75% the length of article 5; flagellum 3-articulate, each article with distinct spines.

Upper lip (Figure 8) rounded, anterior margin slightly concave, with fine setae. Right mandible (Figure 8), molar triturative, inner margin with 3 stout spines; incisor with 5 teeth, lacinia mobilis with 3 teeth; palp 3-articulate, terminal article clavate, with facial and apical plumose setae. Left mandible similar to right, but incisor with 4 teeth and molar with an accessory plumose seta. Lower lip (Figure 8) normal, anterior and inner margins with fine setae. Maxilla 1 (Figure 8), inner plate absent; outer plate with 6 apical spines, center two spines bifurcate; palp 2-articulate, terminal article with 4 spines and a submarginal plumose seta. Maxilla 2 (Figure 8), plates subequal in width, both with apical setae; inner margin of inner plate with 4 small spines and fine setae. Maxilliped (Figure 8), inner plate with submarginal setae; outer plate with inner marginal spine row and submarginal setae; palp 4-articulate, articles 2 and 3 with marginal and submarginal setae, terminal article one-third the length of article 3, with apical setae.

Gnathopod 1 (Figure 9), coxal plate rhomboidal with distoanterior seta; basis

elongated; article 5 subequal in length to article 6, posterior margin of article 5 expanded, with marginal and submarginal setae, some plumose; article 6, anterior margin setose, palm serrate with marginal setae, some plumose; dactyl bifurcate medially and terminally and not reaching hind margin of article 6. Gnathopod 2 (Figure 9), robust and larger than gnathopod 1; coxa rectangular, distoanterior corner with single seta; basis with distal anterior lobe; palm of article 6 with irregular margin bearing two medial conical teeth, hind margin demarcated by a tooth and one bifurcate spine. Pereopods 5 through 7 (Figure 10), bases with posterior, plate-like extensions; pereopods 3 and 4 (Figure 10), anterior margins of article 6, and pereopods 5 through 7 posterior margins of article 6 with stout setae.

Pleopods 1 through 3 (Figure 8), long and slender, peduncles with 2 harpoon-like coupling hooks, rami with plumose setae. Peduncles of uropods 1 and 2 (Figure 7) lacking interramal spines. Uropod 1 (Figure 7), outer margin of peduncle with 3 spines; outer margin of outer ramus with 1 medial spine, outer margin of inner ramus with 1 medial spine, inner margin of inner ramus with 4 spines. Uropod 2 (Figure 7), outer margin of outer ramus with 1 medial spine, outer margin of inner ramus with 1 medial spine. Uropod 3 (Figure 7) vestigial, with two marginal setules. Telson (Figure 7) dorsally produced and armed with 2 long setae.

Female: 3.2 mm in length. All features same as male except as follows: gnathopod 1 (Figure 11), article 6, anterior margin with plumose setae, hind margin and palm demarcated by a single bifurcate spine, dactyl terminally bifurcate; gnatho-

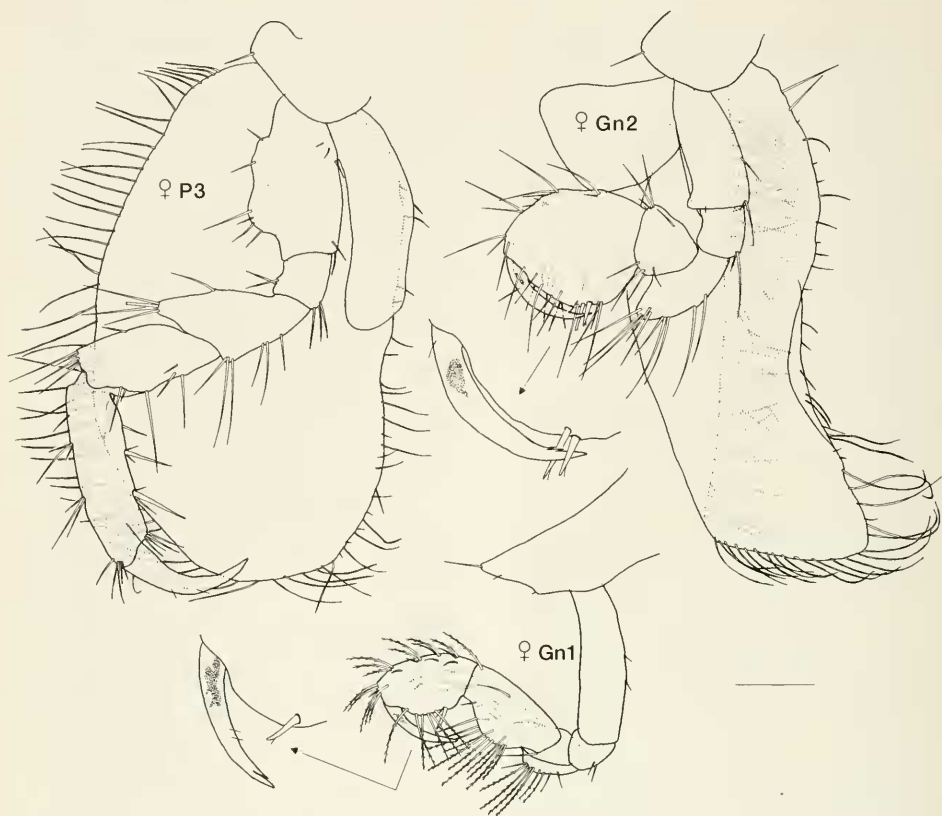


Figure 11

Podocerus fissipes, from Guana Island. YPM 24073, female, 3.2 mm. Scale 0.1 mm.

pod 2 (Figure 11), with large oostegite, article 4 forming a large posterior lobe with long setae, hind margin of article 6 demarcated by two bifurcate spines, palm straight.

Remarks. Serejo (1995) provided a list of the 39 described species in the genus *Podocerus*, and mentioned three species from the coast of Brazil. These are *P. fissipes* and *P. brasiliensis* collected in association with sponges, and *Podocerus fulanus* Barnard 1962 taken from the surface of

intertidal animal colonies. Other than minute differences in the number of marginal setae on antenna 2 and the number of spines on the rami of uropods 1 and 2, the specimens of *P. fissipes* from Guana Island are indistinguishable from *P. fissipes* in Brazil.

Reanalysis of type material of *P. fissipes* has revealed discrepancies in the characters used and illustrated by Serejo (1995). The flagellum of antenna 2 is 3-articulate rather than 4-articulate, and each article of the flagellum has distinct

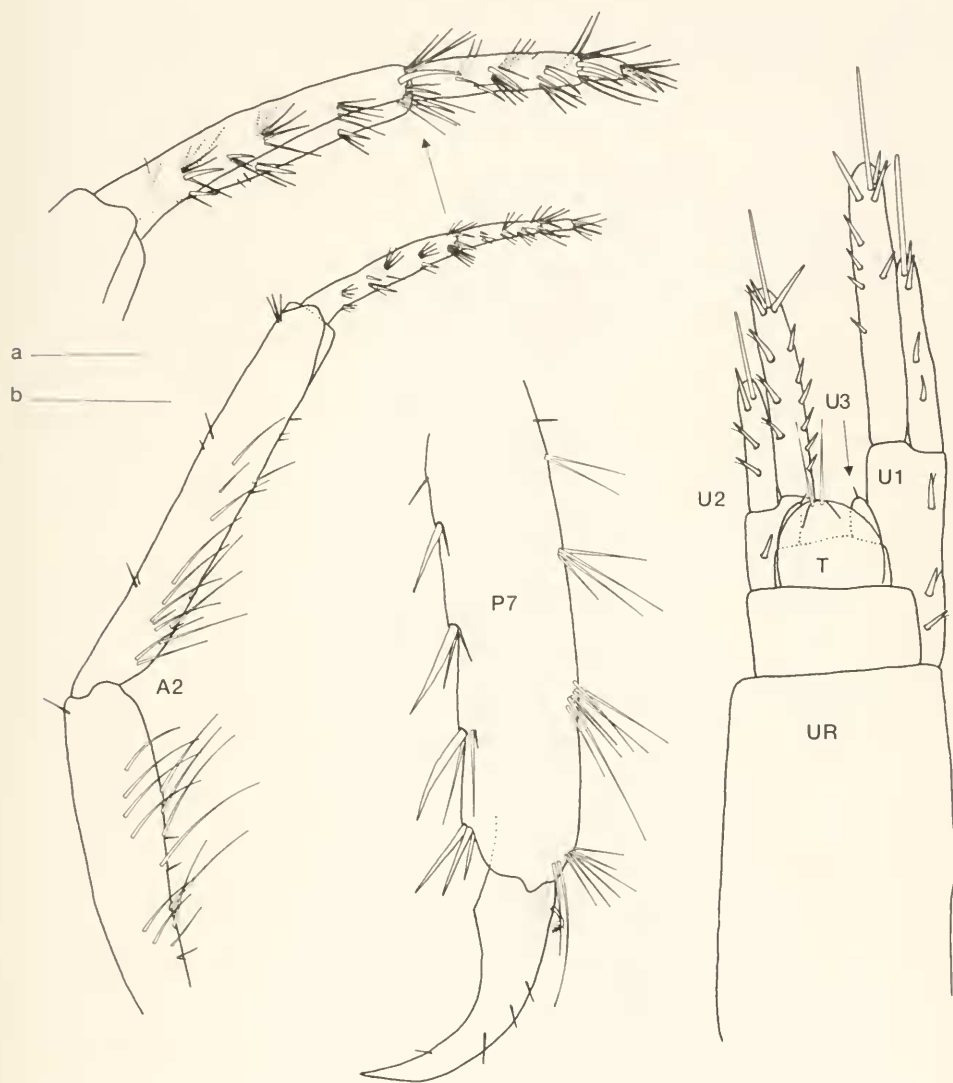


Figure 12

Podocerus fissipes, from Brazil. MNRJ 6431, male, 2.8 mm. Scale: a (A2), 0.1 mm; b (UR, P7), 0.05 mm.

Table 2

Morphological variation between *Podocerus tachyrheo* and *P. fissipes*.

Type locality	<i>P. tachyrheo</i>	<i>P. fissipes</i>
	Bermuda	Brazil
Number of flagellar articles on antenna 1	5	4
Number of spines demarcating hind margin of article 6 of the male gnathopod 2	2	1
Number of marginal spines on peduncle of uropod 1	4	3
Number of spines on outer margin of outer ramus of uropod 1	2	1-2
Number of spines on outer margin of inner ramus of uropod 1	3	1
Number of spines on inner margin of inner ramus of uropod 1	6	4
Number of spines on outer margin of outer ramus of uropod 2	2	1-2
Number of spines on outer margin of inner ramus of uropod 2	3	2-3
Number of spines on inner margin of inner ramus of uropod 2	6	3-6
Number of apical spines on telson	4	2

spines (Figure 12). Unfortunately, only one specimen with antenna 2 from Brazil is available for study. Article 5 of male gnathopod 2 is missing from the illustrations (Serejo 1995: figs. 1b, 2g, 3a) and male gnathopod 1 and 2 are more setose.

Serejo (1995) mentioned that *P. fis-*

sipes is similar to *P. tachyrheo*, a species endemic to Bermuda. Reanalysis of type material of both species has revealed further discrepancies in many of the characters Serejo (1995) used to differentiate these species. The primary differentiating character is "a notch on article 6 of pere-

opods 3–7” that is present in *P. fissipes* and not in *P. tachyrheo*. Superficially this character appears to be a notch (Figure 12), but closer examination reveals that the “notch” is likely a muscle attachment point for the dactyl within article 6. Furthermore, the bifurcate spines on the uropods (Figure 12), described as absent in *P. fissipes*, are actually present in both species. However, there are other features that serve to separate the two species; the most significant differences are shown in Table 2.

Summary

Baldinger and Gable (2000) first reported the presence of *Podocerus* from Guana Island, and in the Caribbean *P. jareckii* and *P. fissipes* are currently known from only Guana Island. The biogeographic distribution of *Podocerus* from islands surrounding Guana and throughout the Caribbean will not be known until further studies are completed. The occurrence of a species from Guana (*P. fissipes*) that exists outside the Caribbean suggests that the amphipod fauna of the Caribbean may be related to adjacent faunas, such as those of Bermuda, the Gulf of Mexico, and the Atlantic coast of South America.

Acknowledgments

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him with field collecting, for helpful comments and discussions on amphipod biogeography, and for reviewing this manuscript. This paper also benefited from reviews by C. O. Coleman, Museum für Naturkunde, Berlin, Germany, and R. Vonk and S. Konenmann, both from the Zoological Museum, Amsterdam, The Netherlands. All errors are the sole responsibility of the authors. We thank C. Serejo of the Museu Nacional UF Rio de Janeiro for the loan of *P. fissipes*, and A. B. Johnston of the Museum of Comparative Zoology, Harvard University, for sharing a departmental microscope. This study has been supported in part by a Museum of Comparative Zoology Barbour Funds grant to A. J. Baldinger, by a CSU-AAUP grant to M. F. Gable, and by the Conservation Agency, through grants from the Falconwood Foundation.

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